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DISEASES OF THE NERVOUS SYSTEM

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

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DISEASES of the NERVOUS SYSTEM

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

Ambulatory Shock Therapy

(A Ten Year Survey)

PAUL CHODOFF, M.D., OSCAR LEGAULT, M.D.
and WALTER FREEMAN, M.D.
Washington, D. C.

Since September 1937, one of us (WF) has been employing convulsive shock in the treatment of various forms of mental illness among private patients. Convulsions were produced by means of metrazol until 1941, after which the electrofit was used exclusively. Until the advent of electroshock, metrazol injections were given to patients in a general hospital. The great majority of the electroshock patients were treated on an ambulatory basis in a suite of offices containing several treatment rooms. Occasional patients have been hospitalized and others treated at their homes, but for all intents and purposes, considering the electroshock group, this can be considered a report on external convulsive therapy. Ambulatory shock therapy was undertaken in large measure because of the reluctance of hospital authorities to admit disturbing patients to overcrowded hospitals during the war. The practice was continued afterwards because of its ease, convenience and safety.

The possibility that patients might be treated with ECT on an ambulatory basis was recognized by Bini[1] in 1940. The first report on its use along with a description of a special apparatus is that of Strauss and McPhail.[2] Wender, Balser, and Beres[3] reported favorably on ECT as an office procedure after finding metrazol unsatisfactory. In recent years there have been a number of rather enthusiastic reports (Patry,[4] Madden and Luhan,[5] Senseman,[6] Feldman, Gombert, and Barrera,[7] Kerman,[8] Kraines,[9] Stockfisch[10]) on the use of ECT both as an office and as an outpatient hospital method. Impastato et al[11] are of the opinion that the private ambulatory patient responds better than the clinic patient to the electrofit.

Most authors mention various disadvantages which have been summarized by Fetterman.[12] These include the danger of suicide in an unprotected environment, increased responsibility for the family, and the danger that the patient may prematurely stop therapy before an adequate course has been given. Drobnes[13] mentions also the inconvenience of caring for post shock confusional states in an office setting and the fact that the ambulatory patient is not accorded the benefits of a rounded hospital treatment program.

The chief advantage of ambulatory shock is the avoidance of hospitalization with a corresponding saving of time, money, and hospital beds, and the sparing of the stigma which still adheres in the popular mind to mental hospitalization. In addition the patient has the advantage of remaining in his normal environment during treatment and the period of readjustment usually necessary for both the patient and family after the return of the former from a hospital is abolished.

Material and Methods

During the period included in this report, shock treatment was administered to 329 patients. For purposes of evaluating results 38 cases were not included. Three of these were rejected because of lack of sufficient information. In the remaining 35 excluded cases there was no information about the patient later than 1 week following the conclusion of the course of treatments. Of these 35 cases, 8 discontinued therapy against advice after 1, 2, or 3 shocks. This is a small number in relation to the total series and indicates that dropping out of patients before completion of treatment is not a serious problem.

Excluding the 38 cases noted above, there remain 291 patients given shock treatment who have been studied. Of these, 75 were given metrazol and as mentioned were hospitalized for this purpose. During the period of transition from metrazol to ECT, 7 patients were given courses of treatment including both methods. The balance, 209 patients received ECT alone.

The information on which this report is based was obtained almost entirely from the case records of the patients included. These case records consist of a note dictated after the patient had been first interviewed and examined, including diagnosis, and follow up notes dictated before, during and after the course of treatment had been completed, until the patient was lost sight of. The period of follow up ranged from 1 week to several years. Only in a few cases was this period less than three months and these are included because the intent of the report is to show what actually happens to patients treated with shock in private practice.

The cases were classified in the usual diagnostic categories as shown in Table 1. In order to assess the influence of certain ,symptomatic constellations on results, the involutional depressions were broken up into those in whom agitation was especially prominent, 40, those with a strong admixture of obsessive compulsive trends, 10, those with a marked paranoid coloring 9, and the remainder, 61. Among the psychoneuroses there were 42 psychoneurotic depressives of whom 11 showed obsessive compulsive features, 14 obsessive compulsives, 33 anxiety states, 17 conversion hysterics, and 3 unclassified.

TABLE 1

Schizophrenia	26
Paranoid Condition	4
Involutional Depression	120
Manic Depressive, Depressed	24
Manic Depressive, Manic	3
Psychoneuroses	109

In the entire series there were 229 females and 100 males. The patients ranged in age from 12 to 82 and included 34 patients who were 60 years of age or older.

The office-treated ECT patients are required to be at the office accompanied by one attendant, usually a relative, at 8 A.M. They are given no special instructions except to eat a light breakfast, and to void immediately before the treatment. Patients do not disrobe except to remove shoes, and, in the case of men, to remove suit jackets and to loosen neckties. An examining table or a fairly firm couch is employed with the patient supine and a folded pillow or bolster beneath the dorsal spine. We used a Rahm machine, a simple apparatus requiring no special settings. The head electrodes are placed bitemporally and a folded towel used to protect the lips and tongue. Curare, 0.5 mg/kg is occasionally used in muscular patients. In addition to the operator there are one or two attendants. Pressure is exerted on the shoulders by one of these or by the operator if only one helper is available. The other assistant sits on the patient's knees and holds his hands. Very often the accompanying relative assists during the treatment. There is usually a moderate and occasionally a severe emotional response on the part of the relative during the first few shocks, but this subsides and in only a few instances do relatives refuse to continue. The fact that a close friend or relative is present right to the time of consciousness is lost is often a favorable factor in calming tense or apprehensive patients. After the convulsion or convulsions the relative remains with the patient until he is able to leave the office, a period which is seldom more than 1 or 2 hours. Post shock excite-

ment is infrequent, but is sometimes troublesome when it occurs. In rare cases, when such a reaction has occurred after the first shock, sodium amytal 0.5 gm. is given intravenously immediately after subsequent treatments and this is efficacious in preventing the excitement. After the first few treatments there is less tendency for this complication to occur.

Believing that a mild confusional state indicates the end-point of treatment it was found that this could be brought about more quickly and with no increase in complications by intensive treatment. The multiple shock treatment has therefore become standard procedure in the last two years of the period covered. In this method, treatment is given on 3 successive days and then on alternate days until the course is completed. The patient is convulsed twice within a few minutes on each occasion except for the last 2 or 3 treatments when only single shocks are administered. In exceptional cases, with particularly agitated or disturbed patients the first treatment consists of 3 or more convulsions administered in rapid succession. Because of the long period of confusion following 4 to 6 shocks at a time, these treatments are given at home. The highest number of electrofits in one day was 9.

The usual course consists of between 5 and 10 treatment sessions since it was found that if favorable results have not been obtained by this amount of therapy, it is not likely that further treatment will be effective. In addition, prolonged treatment produces a degree of confusion not compatible with satisfactory extramural supervision.

Results

In any discussion of therapeutic results in the treatment of mental illness with shock methods, it seems important to indicate what criteria are being used and how they are being applied. We do not regard shock therapy as a definitive "cure" of mental illness since it has no lasting effect on the personality. We are concerned particularly with its effectiveness as a remedy for distressing symptoms.

Results have been classified as marked, moderate and slight improvement and no improvement. Cases showing marked or moderate improvement were considered as successful while those displaying slight or no improvement were failures.

In addition to detailing results in general according to the various major diagnostic groupings, the data have been analyzed particularly in the case of the involutional depressive group to show how agitation, obsessive compulsive, and paranoid features have altered the effectiveness of the treatment. Results in cases in which the multiple shock method was used have been compared with those treated with one convulsion per treatment session.

Since previous studies have shown that results do not differ materially whether convulsions are produced with metrazol or with the electrical current, and since among the cases here reported the earlier metrazol treated cases were of the same type as those later treated extramurally with ECT, no distinction has been made between the two groups in the following discussion of therapeutic results.

There were 120 patients diagnosed as suffering from involutional depression, (Table 2). Of these, 47 (39%) were marked improved, 19 (16%) moderately improved, 16 (13%) slightly improved and 38 (32%) were not improved. Combining those markedly and moderately improved, there are 66 (55%) who responded favorably and 54 (45%) in whom results were unfavorable.

TABLE 2
INVOLUTIONAL DEPRESSIONS

	Total Cases	Marked Improve.	Moderate Improve.	Slight Improve.	No. Improve.
Involutional Depressions					
Uncomplicated	61	30	10	5	16
Agitated	40	15	5	8	12
With O.C. features	10	1	4	1	4
All Involutional Depressions	120	47	19	16	28

Patients with involutional depression differ in the features which are outstanding in their disease. In some agitation is very striking while others show a strong admixture of obsessive compulsive features. The frequency of paranoid components is so well

known as to warrant a separate diagnostic label in the standard system of nomenclature. To test the generally held belief that paranoid and obsessive compulsive features influence the results with shock treatment adversely and that great agitation is, if anything, of favorable prognostic import, the cases were subdivided under four headings—the agitated, obsessive compulsive, paranoid, and uncomplicated. Of the 40 cases showing marked agitation, 20 (50%) responded favorably and 20 (50%) unfavorably. In 10 cases obsessive compulsive features were of importance and of these results were good in 5 (50%) and poor in 5 (50%). In only 1 (11%) of the 9 cases with paranoid features was shock treatment successful while the other 8 (89%) were failures.

These results can be summarized in the following manner: Of the entire group 55% of involutional depressive patients were materially helped by shock treatment. Marked agitation and the presence of obsessive compulsive manifestations did not particularly influence the results while paranoid features had a very unfavorable effect. Results were best in cases uncomplicated by decisive mixtures of any of the above features, 65% favorable, 35% unfavorable.

There were 24 patients suffering from manic depressive depression and 3 who were in manic attacks. (Table 3.) The disparity is a reflection of the unsuitability of ambulatory shock therapy for manic patients. Of the 24 depressed cases, there was marked improvement in 3 (12.5%), moderate improvement in 7 (29%), slight improvement in 9 (37.5%) and no improvement in 5 (21%). Thus the results were considered to be successful in 10 (41.5%) and unsuccessful in 14 (58.5%).

In 2 of the 3 manic patients, the episode was terminated with shock therapy while 1 was unaffected.

TABLE 3
MANIC DEPRESSIVES

	Total Cases	Marked Improve.	Moderate Improve.	Slight Improve.	No. Improve.
Manic Depressive, depressed	24	3	7	9	5
Manic Depressive, manic	3	2			1

In order to be able to consider all patients treated primarily because of depression as a group, patients classified under the heading of psychoneurotic depressions will be taken up next. There were 42 cases of this kind and of these there was marked improvement in 15 (36%), moderate improvement in 8 (19%), slight improvement in 11 (26%) and no improvement in 8 (19%). (Table 4.) Combining these figures, there was good improvement in 23 (55%) and unsatisfactory results in 19 (45%). It will be seen that these results are identical on a percentage basis with those obtained in the involutional depression group. However, a division of the psychoneurotic depressive cases into those showing considerable obsessive compulsive content and those relatively free of such trends shows that obsessive compulsive admixture had a strongly unfavorable effect on results. Thus of the 31 uncomplicated cases results were satisfactory in 21 (68%) and unsatisfactory in 10 (32%), while of 11 psychoneurotic depressions with obsessive compulsive flavoring 2 (18%) responded favorably and 9 (82%) were unsuccessful. Although they are not definitive these findings suggest that obsessive compulsive features are more of a hindrance to successful therapy with shock methods in the psychoneurotic than in the involutional depressions.

TABLE 4
PSYCHONEUROTIC DEPRESSIONS

	Total Cases	Marked Improve.	Moderate Improve.	Slight Improve.	No. Improve.
PN dep., uncomplicated	31	14	7	8	2
PN dep., O.C. features	11	1	1	3	6
PN dep., Total	42	15	8	11	8

At this point, therapeutic results with all depressed patients, combining the involutional, manic depressive and psychoneurotic groups may be summarized. There were 186 such patients and there was marked improvement in 65 (35%), moderate improvement in 34 (18%), slight improvement in 36 (19%) and no improvement in 51 (28%). Thus results were satisfactory in 99 (53%) and unsatisfactory in 87 (47%).

Cases classified as psychoneurotic depres-

sions have already been considered. Exclusive of these, there remain 67 patients subdivided into obsessive compulsive neuroses (14), anxiety states (33), conversion hysteria (17) and neurasthenia (3). (Table 5.)

TABLE 5
PSYCHONEUROSES*

	Total Cases	Marked Improve.	Moderate Improve.	Slight Improve.	No. Improve.
Obsess. Comp. Neuroses	14	3	2	5	4
Anxiety State	33	6	5	12	10
Conversion Hysteria	17	10	3	1	3
Neurasthenia	3	1	0	1	1
All Psychoneuroses	67	20	10	19	18

(*Exclusive of psychoneurotic depression.)

Of the 14 obsessive compulsives, improvement was marked in 3, moderate in 2, slight in 5, and there was no improvement in 4. The results may thus be considered satisfactory in 5 (36%), unsatisfactory in 9 (64%).

The patients listed as suffering from anxiety states include those with free floating anxiety and those with anxiety found in the form of phobias, usually classed as anxiety hysteria, no attempt having been made to separate the two forms for purposes of evaluating the results with shock therapy. In this rubric (Table 5) were 33 patients and there was marked improvement in 6, moderate improvement in 5, slight improvement in 12, and no improvement in 10. Totaling these results there were 11 (33%) successes and 22 (67%) failures.

Among the 17 patients whose diagnosis was conversion hysteria (Table 5) 10 showed marked, 3 moderate, 1 slight, and 3 no improvement, or good results in 13 (76%) and poor results in 4 (24%).

If all patients suffering from the various types of psychoneurosis, including the 3 neurasthenics but not including the psychoneurotic depression, are considered, there is a total of 67. There was marked improvement in 20, moderate improvement in 10, slight improvement in 19 and no improvement in 18, so that the results can be considered satisfactory in 30 (45%) and unsatisfactory in 37 (55%).

In discussing these results it should be again emphasized that relief of overt symptoms is the only possible criterion of improvement in shock therapy and that since the characterological basis of the neurosis remains there is little assurance that the patient is not in for further difficulties at some later time in his life. Treatment was ineffective in a considerable majority of the patients with obsessive compulsive and anxiety neuroses and was strikingly successful only in those suffering from manifestations of conversion hysteria. Considering the known efficacy of suggestive and persuasive methods in obliterating conversion symptoms, such a result might be anticipated. However, many of the patients with conversion hysteria in whom shock was effective had been previously unsuccessfully treated with less drastic methods.

There were 26 schizophrenics and 4 patients suffering from paranoid conditions. The small number of cases in this rubric indicates our pessimism in regard to the effects of shock therapy in this disorder. Because of the close similarity between the two groups, the 30 cases will be listed together for evaluation. There was marked improvement in 4 (13%), moderate improvement in 2 (7%), slight improvement in 6 (2%), and no improvement in 18 (60%). Thus, results were satisfactory in 6 patients (20%) and unsatisfactory in 24 (80%).

This generally poor result is not surprising in view of the known lack of success of shock methods in a majority of schizophrenic states. However, since all failures required relatively prolonged hospitalization in mental hospitals, it is an observation of some importance that remissions can be brought about without the necessity for hospitalization in a certain number of schizophrenics who are not too disturbed to be treated extramurally for a time.

There were 5 patients with primarily organic conditions. These included 2 paretics and a case each of spasmodic torticollis, post traumatic cerebral syndrome and cerebral arteriosclerosis with agitation. Results were unsatisfactory in all of these.

Multiple Shock

The technique of giving more than one convulsive shock per treatment session was first used as an emergency method in order rapidly to control certain particularly agitated and disturbed patients. The impression was gained that favorable results were brought about more quickly in this way than by the standard method of a single convulsion each time.

Of the 186 patients who received shock therapy because of depressive syndromes, including the involutional, psychoneurotic and manic-depressive depressions, there were 128 who were treated in the usual manner receiving a single shock at each treatment session. The remaining 58 received more than one convulsive shock at some or all of the occasions on which they were treated. This does not mean that all of these 58 were subjected to double or triple shocks each time but that the sum total of convulsions in each case was greater than the total number of treatment sessions. In this multiple shock group results were satisfactory in 37 patients or 64% while in the single shock group of 128, results were satisfactory in 62 patients or 49%. This difference is not statistically significant since, using the Chi Square Test, the probability that it is greater than a chance variation is only 1% to 5%.

Among the 67 patients diagnosed as suffering from various types of psychoneuroses except the psychoneurotic depressions 31 received the multiple and 36 the single shock method of treatment. Of the 31 in the former group, results were satisfactory in 10 patients or 32% while of the 36 receiving a single convulsion per treatment session, results were successful in 20 patients or 55.5%. Thus in the psychoneurotic group, the figures certainly do not indicate any superiority of the multiple shock method as far as the number of successful results is concerned. Thus in both of these groups of patients, the multiple shock method did not increase the number of successful results and should be used only in individual agitated or acutely suicidal patients with the expectation that if results are to be satisfactory they will be brought about more rapidly without additional risk.

No attempt has been made to compare the results with the multiple and single shock methods in the group of schizophrenic patients since there were not enough of these to make such an analysis of value.

Complications

The 329 patients who received shock treatment during the period covered by this report were given a total of 2785 convulsions. There were no deaths directly attributable to the treatment. Skeletal fractures are known to have occurred in 14 patients. These were of the vertebrae in 6, the humerus in 5, the scapula in 1, the ulna in 1, and the femur in 1. One of the patients who incurred a vertebral fracture also suffered a fracture of the acetabulum at the same time. Cerebral thrombosis occurred in a patient who was a known diabetic. Prolonged cardiac asystole with an almost fatal outcome occurred once and in one other patient with bronchiectasis and asthma treatment had to be terminated because of severe cyanosis. In an alcoholic patient, a Korsakov's syndrome was precipitated.

Physical complications present in patients before shock treatment was begun included: hypertension, arteriosclerosis, diabetes, quiescent pulmonary tuberculosis, renal tuberculosis, asymptomatic neurosyphilis, paresis, choroiditis, old vertebral fracture, inguinal hernia, kyphosis, peptic ulcer, bronchiectasis and asthma. Except as mentioned in the previous paragraph, these conditions were not affected adversely by the shock treatment and the patients suffering from them did not incur any new complications.

Summary and Conclusions

During a 10 year period from 1936 to 1946 shock therapy, both metrazol and ECT, was administered to 329 patients who received a total of 2785 convulsions. Although some patients were hospitalized most were treated on an ambulatory basis in an office setting. This method is described fully and has proved to be practical, convenient and safe. There were no deaths. Skeletal fractures occurred in 14 patients.

Shock therapy is a symptomatic remedy, not a "cure" for mental illness, and results in 291 patients subdivided into the usual di-

agnostic categories have been evaluated from this point of view.

Results were good in 55 of 120 patients suffering from involutional depressions. The influence of paranoid features was very unfavorable, marked agitation and obsessive compulsive manifestations had little effect, and results were best in uncomplicated cases.

In manic depressive depressions, results were satisfactory in 41.5% of 24 patients.

There was satisfactory improvement in 55% of 42 patients with psychoneurotic depressions. In this group the presence of a strong obsessive compulsive admixture influenced the results adversely.

Of a total of 186 patients suffering from primarily depressive syndromes there were satisfactory results in 53%.

There were 67 psychoneurotic patients exclusive of those suffering from psychoneurotic depressions. Results were satisfactory in 36% of 14 obsessive compulsives and in 33% of 33 anxiety states, while 76% of 17 patients with conversion hysteria showed good results.

Thus shock therapy was relatively ineffective in relieving obsessive compulsive and anxiety states but was quite successful in removing hysterical symptoms often when other methods had failed.

Results were poor in 26 patients with schizophrenic psychoses and 4 with paranoid conditions, only 20% responding favorably.

The technique of multiple shock is described. This method did not increase the number of successfully treated cases but was effective in quickly controlling certain disturbed or suicidal patients and was not hazardous.

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Selection of Patients for a Teaching Hospital and Effect on Resident Training

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A psychiatric hospital which professes to train residents must necessarily adopt certain policies favorable to this end. Paradoxically, such policies may be at variance with the practice of hospitals where immediate treatment of large numbers of patients and general service are of first importance. Because the type and quality of patients admitted are the bread and meat of the training program . . . from them residents learn and on them they practice . . . consideration must be given the diagnostic categories involved, the manner in which patients come to the hospital, their length of stay, what can be done to and with them, what ancillary services are available and other important factors too numerous to mention here. To us, these spell the difference between a hospital in which residents learn and are taught, and one in which residents work and are worked.

At the Psychiatric Institute, we have been carefully following the related matters of admission policy and quality of patients received, and feel we have reached a fairly satisfactory level of performance.

We have effected a liberal practice designed to bring into the hospital the types of cases believed necessary for teaching, training, and research. Herein are present data—based on eight hundred patients admitted between April 24, 1944, and May 13, 1949—concerning the present admission policy and the clinical material received, and some observations on the psychiatry training program which we feel improved as a result of the change in policy later described. Teaching and research are not overlooked but are included by implication.

In a way this paper is a follow up of and comparison with a previous study, by Pearson and Rosenzweig,[1] of the first two hundred cases admitted (November 16, 1942–April 24, 1944). In that paper the authors emphasized the admission procedure then in use (commitment to a state hospital, selection for and transfer to the Institute); discussed special needs of the Institute (patients for teaching, training and research, in psychiatry, nursing, social work and psychology); and compared the diagnoses made at state hospitals with those made after more intensive study at the Institute. However, here we are omitting the matter of comparative diagnoses because earlier it was shown that there was substantial agreement between the hospital of first admission and the Institute, nor are the purposes of the Institute further elaborated unless they help to clarify discussion.

In 1946, subsequent to the two hundredth case reviewed by Pearson and Rosenzweig, and after a fourth of the present eight hundred patients were admitted, to meet recognized deficiencies in the quality of patients admitted by transfer, the policy of admission was liberalized to include the direct admission of selected voluntary patients in addition to the transferred committed cases. While the principal reason for the change in policy was to improve clinical material for residents, yet, worthwhile but distinct, the liberalized policy also has worked to make hospitalization easier and earlier for the patient, thus approximating the facility with which a sick person enters a general hospital.

The following condensed table shows the type of admission by year on the basis of the eight hundred patients under discussion; the first and last years are incomplete; the first two hundred patients are not included because all but a few were admitted by transfer and these few were unavoidable emergency admissions. Pennsylvania law has always permitted voluntary admission

From Western State Psychiatric Institute and Clinic, Pittsburgh, Pennsylvania.

but to our knowledge, only the Institute has made such free and deliberate use of this provision.

TABLE 1

	1944	1945	1946	1947	1948	1949
Transfers	47	142	109	73	90	23
Voluntary Admissions	1	0	41	135	119	22
Total Admissions	48	142	150	208	207	45

It is obvious that after 1946 the proportion of voluntary patients greatly increased. Although it cannot be shown in the table, it was apparent to us that there was a marked improvement in the quality of the patients—younger in age, younger in duration of illness, better preserved, with more insight and desire for treatment. As shown in Table 2 following, we received a much better spread of conditions for teaching purposes.

Table 2 shows the main diagnostic categories based on the first two hundred patients, the same breakdown, total and by years, on the present eight hundred patients, and in addition the percentages of the different categories which we originally felt in 1944 to be necessary for teaching purposes.*

Attention is called to the large proportion of psychoneurotic patients in 1946-47 with the trend continuing into 1948 and 1949. Not only were the percentages large but the cases were better for residents' purposes and not the extremely sick psychoneurotic patients commonly seen in state hospitals.

It will probably be easier to understand what transpired if, as a background, the following are briefly mentioned: 1) the Institute does not act as an acute admitting hospital nor as a community clearing house but was built by the Commonwealth to be a teaching, training, and research center; most teaching is carried out with schools and departments of the University of Pittsburgh; training and research are of the Institute but may be in collaboration with other state hospitals, general hospitals, colleges and universities; 2) patients can be selected from state hospitals and the out-patient clientele according to the needs of the Institute; they may also be referred by state hospitals and other sources for special diagnostic and therapeutic procedures; 3) the bed capacity of the Institute is, for practical purposes, about 140, and the capacity of the Out-Patient Department in terms of active patients is approximately 110; the case load of a resident or junior physician varies but seldom exceeds 30 patients of whom some are static while others require active care; the patient may stay as long a time as he and his doctor think necessary with only moderate administrative pressure to insure turnover; it may be interesting to know that the patient and his family are charged no more at the Institute than the rate in the state hospital from which he came or in the case of voluntary patients, to which he would have gone had he been committed even though the per capita cost in the Institute is higher by the day than the weekly rate in state hospitals; 4) ex-

TABLE 2

	PERCENTAGES			PERCENTAGES 800 PATIENTS, BY YEAR					
Psychoses	Desired	On 200 Pts.	On 800 Pts.	1944	1945	1946	1947	1948	1949
Organic	20	21	18	24	22	20	14	14	11
Affective	15	18	15	10	16	18	15	12	9
Schizophrenic	35	52	41	50	52	30	37	40	51**
Psychoneurotic	15	3	18	8	6	27	26	14	20
Others		6	8	8	4	5	7	20	9

*Diagnostic groupings rather than diagnoses themselves were considered in the earlier paper and are again used. Under the heading of organic psychoses are included general paresis, post encephalitic sequellae, and alcoholic, traumatic, arteriosclerotic and senile conditions. The affective disorders comprise cases of manic excitement, involutional melancholia, and depressive disorders other than reactive depressions. Schizophrenic reactions include dementia praecox, paranoia, paranoid conditions and, for convenience, several instances of psychoses associated with psychopathic personality. Under the psychoneuroses are found the usual conditions so classified and, in addition, the reactive depressions. The group "others" contains patients with mental deficiency and some suffering from conduct disturbances but not strictly psychotic nor psychoneurotic.

**This number is increased due to the admission of a number of schizophrenic patients admitted for lobotomy from Torrance State Hospital, Torrance, Pa., a research project under the direction of Yale D. Koskoff, M.D., Neurosurgeon to the Institute.

tensive departments of psychiatric nursing, clinical psychology, social work, and various clinical laboratories are available, and the resident is encouraged to use them; further, residents are encouraged to use the various treatment modalities freely but are supervised.

As indicated earlier, there were deficiencies in the original admission plan which interfered with the efficiency of the training program and prompted the action that was taken. Table 2 shows that when patients were admitted only by transfer, the proportion of psychoneurotic patients was extremely small but rose when voluntary patients were admitted in larger number. The lack of psychoneurotic patients can hardly be considered as a fault of the state hospitals from which we drew patients but rather reflects the condition under which most state hospitals have to operate.

In short, in the period of the two hundred patients, we found ourselves at a disadvantage when restricted to the state hospitals for material. Everyone knows that the average large mental hospital today is overcrowded with run-of-the-mill psychotic patients who are usually quite sick and often hospitalized over a long period of time, and deteriorated. Such patients are not satisfactory for certain teaching purposes, particularly the way teaching and training are going today. (This statement is made with full knowledge that our large state hospitals in the past have been the backbone of teaching and have produced large numbers of trained, skilled psychiatrists. This is only taking reality into consideration.) Actually the state hospitals collaborating with us during this period of time exerted themselves but had great difficulty, with their own troubles, in referring patients to us. In addition to the lack of good patient material, there were other intrinsic difficulties, as the curtailment of transportation during the war, shortages of staff in most state hospitals making it difficult for them to cooperate in such a plan, and the understandable reluctance of state hospitals to transfer patients with a good prognosis.

Consequently in 1946, an arrangement was made with several local general hospitals to admit from their wards, on a voluntary basis, patients who were diagnosed as having psychoneuroses, psychosomatic conditions, mild states of emotional imbalance and the like. One reason for working through the general hospital was the hope that such a plan would bring the general and the mental hospitals closer together. This relationship was not effective, even though the plan included a screening interview by a psychiatrist from the staff of the Institute.

The failure to work out such a liaison was disappointing though not surprising. It seemed to us that the general hospital lost interest, came to look on the plan as a way to get rid of undesirable patients, although the ones we wanted were those who would benefit from psychiatric care but who could not, because of the time and technics involved, be treated in a general hospital. Internists and others in the general hospital seemed unable to give up patients. Further, some patients left the Institute shortly after admission, a considerable waste of time, effort, and money; such self-discharges, we felt, were often due to insufficient preparation for the transition while in the general hospital.

On several occasions, possibly due to our own poor selection, it was necessary to commit a voluntary patient to a state hospital due to increasing severity of symptoms precluding his remaining as a voluntary patient. This could have been avoided by the general hospital's directly committing the patient but in some instances our better judgment was mitigated by the desire to be helpful (actually this and early self-discharges also happened when admissions were later even more directly under our control but to a lesser extent; they probably cannot always be foretold).

The next step . . . it would logically have come in first had we not courted the general hospital . . . was to turn to our own Outpatient Department. Here, control over admission and selection was much better. Certain criteria had already been set up for acceptance in the Mental Health Clinic which, when extended, virtually assured us of satisfactory in-patients.

These criteria included: 1) state residence; 2) need for total psychiatric study,

not merely neurological or psychological examination; 3) age range 18-60, younger or older only by special permission of the Clinical Director or the Director; 4) not eligible for private or other-agency care; 5) accessible for examination, cooperative, able to speak English; 6) acute symptoms, at least not incapacitated for more than a reasonable length of time; 7) residence within a comfortable travelling distance of the Institute —to allow out-patients to visit the Clinic, relatives to come to see in-patients and social workers to visit the home; 8) treatability—including normal or near-normal intelligence, some insight and desire for treatment, and evidence of previous ego-strength, frustration-tolerance and the like.

In addition, we considered as favorable for admission to the house those cases 1) where hospital residence would allow closer observation than is possible on an ambulatory basis, and 2) permit diagnostic procedures and specific treatments ordinarily taking a limited period of time, as EST, prolonged narcosis, hypoxia, aversion, etc. When the mental condition of the patient was so serious as to require more extensive treatment, as insulin shock, or lobotomy, it was felt that he should be first committed to a state hospital, then transferred. Conversely, we considered as unfavorable: 1) the need for intensive psychotherapy; 2) cutodial care per se; 3) removal from an unpleasant home situation as an end in itself; 4) frank psychosis, preventing or likely to prevent voluntary action; 5) manifest psychopathic and very strong dependent trends.

Admittedly, this screening process was relatively rough and not every point could be determined early in the out-patient setting. However, these general indications were and have continued to be of great value in selecting the few who can be admitted from the many available. The Mental Health Clinic asks that patients be referred by doctors but accepts other types of referrals, i.e.—social agencies, self, hospitals and clinics, ministers, courts, etc. The Clinic receives about 1,000 referrals a year of which number 200-250 can be seen in screening conferences (these conferences are also used to teach medical students) where a further selection is made. The doctors and social workers in the Clinic try to give the referring doctor, patient or his family at least some kind of advice in case the patient is not accepted for treatment.

Originally it was thought that a month would be sufficient for the voluntary patient. This idea had to be discarded as impractical, and the time determined on the basis of the patient's and his doctor's needs. Three months is now considered to be a more reasonable length of stay.

Psychiatric residents today want the sort of training that will enable them to be successful in private practice, and very few of them want careers in state hospitals. Harrison's figures show this conclusively.[2] This means that state hospitals will have to adopt policies favoring teaching, and teaching hospitals will have to fashion their programs to meet residents' changing needs. The day has passed when state hospitals, under the guise of teaching, can employ one or several residents to carry out the relatively minor hospital work. The day will probably never return unless state hospitals agree to lighter and diversified case loads or pay higher salaries in the lower positions, or until the field of private psychiatry is glutted, or there is an economic depression which drives the less successful from private practice to hospital systems.

Thus hospitals which want residents and are willing to teach them have to provide proper case material, make provision for adequate supervision, allow time for study and research, and the like. We believe that the average state hospital, restricted to the types of patients it has to accept, is handicapped to the point of making it impractical to carry on a teaching program without help. More and more with their overcrowding, state hospitals are forced to admit the sicker, the more delapidated, and the older patients. Less and less as this happens, can students see and know the types of patients making up the bulk of private medical and psychiatric practice. Whether or not it is applicable to other mental hospitals, we feel that the admission of voluntary patients on a large scale, if properly selected, overcomes many of the difficulties just mentioned.

At the same time, while emphasizing the

importance of psychoneurotic and psychosomatic patients, it should be pointed out that general psychiatry cannot be learned from this select group. It has never been our intention to exclude psychotic patients who can be transferred to us, considering them necessary to an overall training program. Having implied that the state hospital is not sufficient for training, it is only reasonable to go on to say that the equally restricted psychiatric institute with its small census, limited residence, and intensive treatment of the few, is also inadequate in itself. Basically we feel that the state hospital is the place for large scale teaching but that the institute-type of hospital is better able to teach methods of examination and treatment and can, because of its usually more favorable location, include other basic training programs and case material. The combination of the two types of hospitals, given medical school, university and medical center support, is the ideal.[3]

The new plan of admission made possible something else, namely a better division of patients among residents by assigning patients to doctors in rotation regardless of such superficial determinants as sex, age, type and degree of illness, duration of illness, etc. (Occasionally, a particular resident was selected for a patient because his personality seemed best for the patient, and occasionally, patients were given to residents, in the belief that the latter needed the special experiences involved.)

Thus we have been able to do away with such artifices as the men's service, the women's service, the chronic and convalescent service, etc. This makes it possible for each resident to have a case load of reasonable size composed of both men and women, both transferred and voluntary, both acute and chronic patients, approaching the patient load he will eventually have in private practice. This, particularly when combined with out-patient experience, gives the resident a sound basis of experience.

One gap, however, is the relative scarcity of early psychoses. Such patients infrequently are obtained from the state hospital and because of their psychotic symptoms are unable to sign a voluntary application. Frankly such patients can be admitted—and minors as well—by following the spirit rather than the strict letter of the law.

Even with our small case load, we have noticed that residents occasionally find it difficult to discharge patients which, of course, is a problem of training. However, if this can happen in a small active hospital how much more likely it is in a large state hospital, which explains in part why many state hospitals become overcrowded with patients retained too long a time. Adequate supervision of residents obviates this to a degree. Paralleling this, we have occasionally seen that patients retreat into hospitalization and become inured to treatment to such an extent that they have to be summarily discharged. Here, administrative pressure and selection of patients with previously good ego-structure are important. It should also be kept in mind that some psychoneurotic and psychosomatic patients require as long and as careful hospital care as psychotic patients, nor are they necessarily more treatable except by heroic measures and over a long period of time.

We also experimented with the dual system whereby one member of the staff acted as therapist and another handled administrative details. In practice this was not particularly successful, and further we held that the resident should learn and accept full responsibility; the private practice of psychiatry certainly demands that he do so.

From the point of view of residents, a certain number of patients responding favorably to treatment is necessary. Our earlier estimate of one month as the time necessary for residence in the hospital was soon found to be entirely too short, and consequently we have given up the idea of the time limit in favor of the time necessary for success or failure. Occasionally patients, particularly in the transfer group, have been retained over long periods of time because they are useful for teaching or research purposes or for multiple therapy.

To deviate briefly from the subject of admissions and to speculate on two related matters, in a psychiatric hospital where the case load is small and the staff large, certain things become possible. These include organized teaching schedules, encouragement of research, teaching by residents,

close integration of in-patient and out-patient departments, collaborative teaching programs and the democratic process of committee work.

While all that has been said reflects on the teaching process, some comment should be made of the benefits from such teaching that the community receives. A community without an acute admitting hospital is handicapped, particularly if the state hospitals are full, as is usually the case, and the general hospitals have made little or no provision for mental cases. Frankly, the Institute does not offer relief in this extremity; as mentioned above, it is not an admitting hospital for psychotic patients from the community. However, in the long run a better purpose is probably served by the teaching process, that is—through the medical students, social workers, and nurses who are taught, the professional level of the community rises to the point of preventing and treating mental illness before it reaches the level of the psychiatric hospital. In addition, training of psychiatrists from state institutions, which is one function of the institute-type of hospital, ultimately results in better clinical practice there, which, in turn, means earlier admission, more intensive treatment, earlier discharge and thus improvement in the number of patients treated. Needless to say the admission and treatment of early cases in the out-patient department is a distinct social and economic help in itself.

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Brain Tumors in Mental Patients

(A Statistical Study)

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In recent years a few reports have appeared in the literature concerning the incidence of intracranial tumors in patients in mental hospitals. Each report enumerates approximately 200 cases, the largest series being 223[1] and the smallest 120.[2] Because of the limited number in these series it was considered that a larger group would be of interest and would add to the knowledge of intracranial tumors in mental patients.

In the period from January 1, 1938 to June 15, 1949 a total of 1277 autopsy examinations were performed by the department of pathology at the Colorado State Hospital. The brain was examined in 1168 cases, or 91.5% of the total. During this same period 3857 deaths took place, giving an autopsy percentage of 33.1%. If we include only the 1168 cases in which the brain was included in the examination, the autopsy percentage becomes 30.2%.

In the 1168 consecutive brain examinations, a total of 54 intracranial tumors were found, an incidence of 4.6%. However, of these 54 tumors, 12 were too small to be of clinical significance and one was a metastatic tumor which had invaded the skull but had not encroached upon the brain itself. In the 12 which were thought to be too small to be of clinical significance there were eight meningiomas, two basophilic adenomas of the pituitary without clinical manifestations, and two small angiomas.

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By eliminating the above mentioned 13 tumors from the total number, 41 tumors which were large enough to be of clinical significance remained, or a corrected incidence of 3.5%. This figure is very close to that of Hoffman[3] who reported an incidence of 3.4%, and it is slightly less than the 4.9% reported by Zfass and Riese,[4] and the 5% reported by Crumpacker and Riese.[2] However, it is far below the 13.5% incidence reported by Larson,[1] a figure which has been questioned[4,5] due to his inclusion of cerebral aneurysm and choroid plexus cysts in his statistics.

In the older literature Davidoff and Ferraro[6] reported 90 cases of brain tumor in 1450 brains which had been collected over a period of 26 years. After allowing for the special interest which stimulated the collection, they estimated that the incidence of brain tumor in mental patients would not be greater than .1%. In 1903 Blackburn[7] reported an incidence of 1.7% in a series of 1642 autopsies on mental patients.

Ewing[8] states, "The frequency of occurrence of brain tumors cannot be accurately stated. Probably about 1% of deaths are from this cause." Garland and Armitage[9] in a series of 13,000 autopsies found an incidence of intracranial tumor of 2.02%. These figures on autopsies on general hospital patients are slightly lower than most of the series reported on mental patients, but the number of autopsies reported in mental patients is still not large enough to draw any definite conclusions.

Table 1 compares the incidence of the various types of tumors in our series with the series reported by Larson,[1] which was similar to this series in that it was based on autopsy material entirely, and that of Cushing,[10] which included biopsy material and surgical specimens.

Our percentage of 19.5% metastatic lesion is considerably higher than the 4.2% of Cushing[10] and the 6.6% of Larson.[1] Garland and Armitage[9] reported an incidence of 17% metastatic tumors from the Leeds General Infirmary, a percentage which is in conformity with our figures. The low incidence reported by neurosurgeons may, according to Bailey,[11] be due to the fact that they see only those in which the primary source has not been discovered.

TABLE 1

Type of Tumor	No.	%	No.	%	No.	%
	Cushing Series (10)		Western State Hospital (1)		Colorado State Hospital	
Gliomas	862	42.6	4	13.3	11	26.8
Pituitary Adenomas	360	17.8	4	13.3	2	4.8
Meningiomas	271	13.4	8	26.6	12	29.2
Neurinomas	176	8.7	–	—	3	7.3
Congenital	113	5.6	–	—	1	2.4
Metastatic and Invasive	85	4.2	2	6.6	8	19.5
Granulomatous	45	2.2	4	13.3	1	2.4
Blood Vessel Tumors	41	2.0	2	6.6	2	4.8
Sarcomas (Primary)	14	0.7	–	—	–	—
Papillomas	12	0.6	4	13.3	–	—
Miscellaneous	44	2.2	2	6.6	1	2.4

Table 2 is a brief presentation of the 40 cases in which the postmortem diagnosis is established. An additional case is not included as it has never been diagnosed grossly or microscopically. The duration of symptoms given in the table refers to the length of time the symptoms were present as near as could be determined, and it must be understood that this period of time is for the duration of the neurological symptoms only, as a correlation of the mental symptoms and the lesions would be outside the scope of this paper and will be reported on at a later date.

Twenty-one (52.5%) of the patients were males and 19 (47.5%) were females. Of the 40 tumors, 18 (45%) were diagnosed as tumors before death, six (33⅓%) being operated on. Of these 18 tumors five were metastatic, one of which was thought to be a primary intracranial lesion. The other four were correctly diagnosed as being metastatic lesions.

Of the 22 cases in our series which were not diagnosed as brain tumor, eight patients had a diagnosis of psychosis with cerebral arteriosclerosis, five were diagnosed senile psychosis, three dementia praecox, two general paresis, one Huntington's chorea, and one subarachnoid hemorrhage with diffuse brain damage. One case was never diagnosed clinically and another was diagnosed as Hodgkins disease with intracranial extension. McIntyre[12] stresses Alzheimer's disease as being the most frequent incorrect

TABLE 2

Autopsy Number	Pre-Mortem Diagnosis	Age at Death	Duration of Symptoms Yrs.	Mos.	Type of Tumor	Location
Gliomas:						
A-31-45	Subarachnoid Hemorrhage	59	1		Ependymoma	Pineal
A-18-46	Intracranial Tumor	25	2	6	Glioblastoma Multiforme	Left frontal lobe
A-87-45	Intracranial Tumor	55		4	Glioblastoma Multiforme	Left temporal lobe
A-13-38	Intracranial Tumor	38	2	6	Glioblastoma Multiforme	Left temporal lobe
A-63-44	Intracranial Tumor	28	1	4	Glioblastoma Multiforme	Left superior frontal gyrus
A-132-47	Cerebral Arteriosclerosis	69	1		Glioblastoma Multiforme	Left frontal lobe
A-39-38	Intracranial Tumor	19		2½	Spongioblastoma	Left parietal lobe
A-3-40	Intracranial Tumor	48	6		Oligodendroglioma	Left parietal and frontal lobes
A-58-42	Intracranial Tumor	60	22		Astrocytoma	Right frontal lobe
A-40-45	Intracranial Tumor	53	5		Astrocytoma with Medulloblastoma	Left parietal lobe
A-90-49	Senile Psychosis	79	4?		Astrocytoma	Left temporal lobe
Pituitary Adenomas:						
A-65-43	Cerebral Arteriosclerosis	62	2		Acidophilic Adenoma	Pituitary
A-48-42	Senile Psychosis	78	14?		Chromophobe Adenoma	Pituitary
Meningiomas:						
A-17-45	Dementia Praecox	58	1?		Meningioma	Olfactory groove
A-17-38	General Paresis	46		10?	Meningioma	Left parietal lobe
A-26-44	General Paresis	86	2?		Meningioma	Right frontal lobe
A-8-43	Dementia Praecox	47	3		Meningioma	Right frontal lobe
A-19-38	Intracranial Tumor			9	Meningioma	Right parietal lobe
A-109-44	Not Diagnosed	76	?		Meningioma	Sphenoidal ridge
A-155-46	Dementia Praecox	56	?		Meningioma	Olfactory groove
A-70-45	Senile Psychosis	70	2	6	Meningioma	Left temporal, parietal lobes and cerebellum
A-143-48	Cerebral Arteriosclerosis	83		4?	Meningioma	Right frontal lobe
A-83-49	Hodgkins Disease	27	2		Meningioma	Left temporal lobe
A-104-49	Not Diagnosed	51	5		Meningioma	Right temporal lobe
A-30-40	Intracranial Tumor	25	10		Meningiomatosis	Multiple
Neurinomas:						
A-52-42	Huntington's Chorea	42	10?		Acoustic Neurinoma	Left
A-2-40	Cerebral Arteriosclerosis	45	1½		Acoustic Neurinoma	Right
A-6-40	Intracranial Tumor	55	2		Acoustic Neurinoma	Right
Congenital Tumors:						
A-39-44	Intracranial Tumor	21	4		Chordoma?	Cerebellopontine Angle
Metastatic Tumors:						
A-25-41	Intracranial Tumor	51	1*		Adrenal Neuroblastoma	Right cerebellum
A-30-48	Intracranial Tumor	64		2?	Squamous Cell Carcinoma of left middle ear	Left temporal lobe
A-65-44	Intracranial Tumor	68	?		Melanoblastoma	Multiple
A-37-41	Intracranial Tumor	42		5	Melanoblastoma	Left and right lobes of cerebellum
A-158-48	Cerebral Arteriosclerosis	66		5?	Melanoblastoma	Right parieto-occipital lobe
A-90-43	Cerebral Arteriosclerosis	72	?		Bronchogenic Carcinoma	Thalamus and parietal cortex bilaterally
A-34-39	Intracranial Tumor	59		2?	Bronchogenic Carcinoma	Multiple
A-39-49	Cerebral Arteriosclerosis	63	2	6	Bronchogenic Carcinoma	Left orbital gyrus
Granulomas:						Cerebellum, bilaterally
A-4-44	Organic Psychosis	27		9	Tuberculoma	Pons
Blood Vessel Tumors:						
A-148-46	Cerebral Arteriosclerosis	78	?		Hemangioma	Brain stem, upper cervical cord
A-1-38	Arteriovenous Aneurysm	24	12		Arterial Angioma	Occipital lobe

*Under metastatic tumors the duration of symptoms refers to neurological symptoms and not those of the primary tumor.

diagnosis in cases of brain tumor. In only one of our cases was this error made and in this case the correct diagnosis was made at this hospital before the patient died.

It is interesting to compare the age incidence of these tumors, as presented in Table 3. In this table the age group into which the tumors are placed is the approximate age at onset of symptoms, rather than the age at death. In those tumors which were correctly diagnosed previous to death 88.9% were in patients under 60 years of age. This is in marked contrast to the incorrectly diagnosed group, in which 52.3% of the patients were over 60 years of age.

Seven patients had an operation, 6 of which were performed before admission to this hospital. Five of the seven were gliomas (A-3-40, A-58-42, A-18-46, A-87-47, A-13-38). In one case removal of the tumor was attempted. In A-18-46 the left frontal lobe appeared to have been successfully removed, but at autopsy glioblastoma multiforme was found posterior to the resection. A-58-42 is unusual in that the patient first developed the signs and symptoms of intracranial tumor in 1920 at age 38. In 1926 he had an operation on the right parietal region, but the details of it are not known. The patient died in 1942 and autopsy revealed an extensive tumor in the right frontal region which involved all of the right frontal lobe and extended posteriorly to the precentral convolution. On one of the other patients (A-6-40) an operation was begun but the patient died on the table, and in another case (A-29-44) a suboccipital exploration was done but no tumor was found on inspection of the cerebellum. The remainder of the operated cases were judged inoperable when an exploration was done.

Of the 11 gliomas, eight (72.7%) were diagnosed before death. Of the five glioblastoma multiforme cases, only one, A-132-47, a 69 year old male with a left frontal lobe tumor, was not diagnosed. The average age at death of the five glioblastomas was 43 years and the average length of survival was one year and five months from the onset of symptoms. While this series is too small to be of major significance the short stormy course that these cases presented probably helped to account for the higher accuracy of diagnosis.

TABLE 3

Age Group	Diagnosed No.	Diagnosed %	Undiagnosed No.	Undiagnosed %	Combined No.	Combined %
0-10	0	0	0	0	0	0
11-20	3	16.6	1	4 5	4	10
21-30	3	16.6	1	4.5	4	10
31-40	2	11.1	2	9	4	10
41-50	5	27.7	3	13.5	8	20
51-60	3	16.6	4	18.1	7	17.5
61-70	2	11.1	5	22.7	7	17.5
71-80	0	0	4	18.1	4	10
81-90	0	0	2	9	2	5
91-100	0	0	0	0	0	0

In contrast to the gliomas only two (16.6%) of the 12 meningiomas were diagnosed as brain tumors before death. Neither of the cases was operated on. One of the diagnosed cases, A-19-38, had a history of 9 months duration, but a more malignant type of growth was suspected. A large well defined meningioma of the left parietal lobe was found at autopsy. The other diagnosed case (A-30-40) had multiple meningiomas. In case A-83-49 a diagnosis of intracranial Hodgkins disease was made after a cervical lymph node biopsy was taken; autopsy revealed no intracranial Hodgkins but a large meningioma replacing the left temporal lobe.

The age at death of four of the patients with meningiomas was 86, 83, 76, and 70 years respectively. The average age at death in this series was 56 years. Bailey[11] found the greatest number of meningiomas at the age of 45, and Cushing and Eisenhardt[13] stated that meningiomas were rare in infancy and old age. While this small series is not statistically significant, it does call attention to the fact that meningiomas can and do occur in the older age groups and signs and symptoms should be carefully searched for, when patients of advanced age present themselves with mental or neurological changes, before excluding the possibility of meningioma.

It is interesting to note the high incidence (29.2%) of meningiomas in this series. This is in accord with the figures of Larson,[1] but it is much higher than that reported by Cushing. The explanation for this discrepancy may lie in the fact that many of the

meningiomas lie in relatively silent areas in the brain, and also that they produce mental rather than neurological symptoms due to their slow expansive growth in contrast to the more rapidly developing gliomas. Moersch, et al,[14] collected 100 cases of primary intracranial tumors in which the tumors occurred past the age of 60. Of these, 25 were meningiomas but had they included metastatic tumors in their series the percentage of meningiomas would doubtless have been quite a bit lower.

McIntyre[12] speaks of a "lack of brain tumor consciousness," as one of the reasons for the mistakes in diagnosis of brain tumors. He also makes the statement that, "When it is remembered that the meningioma, a benign operable tumor is the most common tumor producing mental symptoms there is all the more reason for improving our diagnostic skill in recognizing tumor as a cause of mental symptoms." It would be wise, in the light of the statistics presented, to bear this suggestion in mind.

Summary

In a series of 1168 consecutive brain examinations on mental patients a total of 41 tumors were found which were of such size as to be of clinical importance. This is an incidence of 3.5%, which in general conforms to the previously published statistics on the incidence of intracranial tumors in patients in mental hospitals; 29.2% of the tumors were meningiomas, a percentage which conforms with that of Larson,[1] but is somewhat higher than that reported by other investigators. The incidence of 19.5% metastatic tumors is likewise higher than the more generally accepted occurrence.

The gliomas, meningiomas and metastatic tumors which were found are discussed briefly.

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POSTGRADUATE COURSE IN PSYCHIATRY AND NEUROLOGY

The Division of Psychiatry, University of California, School of Medicine in cooperation with Medical Extension announces a course on diverse psychiatric and neurologic subjects under the direction of Dr. Karl H. Bowman. The course will extend from August 28th through November 17th, 1950 and will be given at the Langley Porter Clinic, San Francisco, and is open to qualified physicians.

Further details and information may be obtained by writing to Stacy R. Mettier, M.D., University of California Medical Center, San Francisco 22, California.

Evaluation of Psychobiological Integration by Mirror Drawing*

DAVID B. VINSON, JR.
Houston, Texas

Orientation of a patient as to time and place is an integral part of the mental status examination for personality disintegration reveals itself clinically in disorientation of time and space. The capacity to estimate time is well described by Halstead's work and is felt to be a function of biological intelligence. If there is a relationship between the capacity to evaluate or to estimate time, and the functioning of an individual, it would also seem that the capacity to orient oneself in space might have the similar function and be worth investigating. The hypothesis that an individual showing impaired integrative capacities would have extreme difficulty in orienting himself in space might be formulated. It may be possible to go beyond this and postulate that there would be a relationship between orientation in space and orientation in time.

It will be recalled that distortion of time estimation may be produced through hypnosis, an experimental technique. It occurred to the author that a distortion in spatial orientation might be achieved by the use of a mirror. It will be recalled that mirror tracings, using the experimental technique of Snoddy and Starch consists of tracing a star while looking into the mirror. This technique was felt by the author to offer far too many cues which would be helpful to the patient in his effort to orient himself in space. The tracing of geometrical forms such as a triangle, diamond, etc., were discarded in view of the conditioning to certain geometrical shapes. This would allow the patient who was in difficulty to close his eyes, as it were, and to draw the picture from "memory." The tracing of the Porteus Maze, while looking in the mirror, was also discarded for the same reason.

The pilot study was begun shortly after the author received a copy of the Partington's Pathways Test, for in the task of connecting stations in space there is a continual reorientation that must take place at each station.

Approximately one hundred records were made, using the Partington's Pathways Test. The design used by us is similar to the above-mentioned design, however, the stations are arranged in such a way that there are three sets of angles of similar degrees, and each pair of angles require orientation of opposite directions. The second part of the test consists of a second design, slightly different from the first which is used in the post overventilation period.

Apparatus: Although there are several mirror tracing apparatus available, the author prefers to use a 4 x 6 inch mirror held in the hand with the elbow touching the desk or table. This technique offers the possibility of making observations about the patient's behavior in the test situation. Noncompliance, whether the patient is able to keep his "eye on the mirror," and bizarre postures are brought out by this technique.

Administration: The patient is given a practice period, without mirror, allowing him to connect points in space which are numbered. He is then told that he is to do the same thing while looking into a mirror. This is demonstrated. He is told that he may find it more difficult than without the mirror. If he shows failure at the first station he is told that many fail. A time limit of three minutes is given for completion and the patient is stopped wherever he is at the end of the three minutes.

Findings: There are several types of failures which may be classified into definable patterns. First, there is inability to get out of the first station. The response pattern here is that in most cases there are a number of short strokes going off into every direction, not more than a few centimeters from the center of the station. Under these conditions the patient looks as though some invisible force holds him in one spot and he

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perseverates the response. (Grossly impaired.) Slightly less impairment is shown where the patient gets out of station one to station two, or to station three, within the time limit. Here the pattern is one of several false starts with, of course, the greatest difficulty at station one. (Moderately impaired.) The next level is represented by the completion of the design within time limit, but with considerable impairment being demonstrated on one station, usually near the end of the design. (Impaired.) Where the patient is able to complete the design without "difficulty" on any station, however requiring 1 minute 30 seconds to 3 minutes instead of normal time of 1 minute 30 seconds. (Suspicious.) The difficulty which we associate with the performance within normal limits, is where there are some failures in orientation, however, the patient does not get stuck on any of the points in the design. The patient who completes the design in less than one half minute, without showing any difficulty in any of the stations and who makes a practically perfect design is designated as having above average capacity for orientation in space.

The administration of the test allows the examiner to make certain clinical observations about the patient. The resistance to the test is not thought to be great and in comparison to other tests it would be among those having minimal resistance.

The behavior of the psychopath who has difficulty "postponing pleasure" and who "lives for the moment," and who, on the other hand, shows impaired planning ability, anticipatory function, etc., on this test takes the bull by the horns and plunges headlong, first in one direction and then in another. However, characterological or behavioristic findings are not the primary concern of this test. They are, of course, recorded and integrated into the total evaluation of the patient.

This report covers the evaluation of some five hundred patients who have not been selected by diagnosis. The greatest impairment is found to be associated with the clinical picture of psychobiological decline or deterioration which, of course, would include cerebral arterio-sclerosis, CNS lues, posttraumatic syndromes, cerebral dysrhythmia, encephalopathy, brain tumor, etc.

In the above mentioned cases, we found reliable correlation between the mirror test and other diagnostic techniques such as Porteus Maze, Kohs Block Test, Shipley-Hartford, Wechsler Memory Scale, Bender-Gestalt, Rorschach, Goldstein-Scheerer Sorting Test, etc. These findings correlated extremely well with the clinical findings from electrophysiology.

As would be expected, personality disorganization such as in the schizophrenic, manic-depressive psychoses, where again integrated failure and lack of personality synthesis are the outstanding features of the syndrome, impairment is observed. Variance of impairment in the schizophrenic syndrome, of course, is much wider than variance, for instance, in alcoholic psychosis.

The patients with the diagnosis of anxiety state, psychoneurosis mixed type, conversion reaction also show the integrative impairment. The degree to which they are impaired is, of course, not so profound as in the ego-disintegrative disease such as schizophrenia, manic depressive psychosis, and in the degenerative syndromes of the first mentioned group. The so-called normal individual in the performance of the mirror test shows that intelligent well integrated individuals demonstrate minimal difficulty at the beginning of the test and correctly orient themselves throughout the various positions.

The mirror test has been used to evaluate the changes associated with electroshock therapy. In schizophrenia it has been demonstrated that as the patient's contact with reality improves, his performance on the mirror test improves. Where patients become "organic" during the course of treatments, the mirror drawings become grossly impaired. It is also noteworthy that the increasing "organisity" following EST is manifested not only for alteration in tracing pattern, but also in terms of pressure. This increase in pressure follows the same lines as the increase in pressure found in the Bender-Gestalt drawing as observed in post EST performances.

The evaluation of increased impairment after overventilation, especially in cases of

anxiety neurosis, requires special consideration, in view of the hyperventilation syndrome as reported by Rushmer and Bond.

The conclusions drawn from the result of this test are felt to demonstrate the possibility of evaluating integrative failure by mirror drawing. While qualitative as well as quantitative impairment may be revealed by this test, it is felt at the present time that diagnosis between encephalopathy, for example, or conversion reaction should be made on the basis of the psychiatric, neurological or electro-physiological findings as well as on psychological tests which may be used to establish a differential diagnosis based on specific impairment, i.e., concept formation, abstract thinking, etc. This test lends itself well to the various theories concerning integrative failure. For instance, it will hold equally well for the Pavlovian or Behaviorist who thinks in terms of cortical inhibition or in terms of a splitting off from the stream of consciousness as conceived in the concept of hysteria by Janet. It would also fit in with the formulation of a diminution of attention as seen in the catatonic picture as described by Sommer. It is compatible with the newer theories of electrophysiology. In Halstead's book "Brain and Intelligence," he formulates a theory of a central integrative function. Our hypothesis has many points of similarity to the view taken by Halstead. We conceive of the integrative capacity as being expressed in a capacity to concentrate the stream of effort on a given task and to be able to maintain that concentration of effort over a given period of time. Factors such as anxiety, ideational pathology, toxic conditions, physiological and electrical alterations, cortical lesions, etc., all contribute in their own way to impair this integrative function. For a very crude analogy, if you please, let me compare psychobiological integrative function (concentration of a stream of order) with well known electronic devices such as the cathode ray. The focus of a cathode ray, in a television receiver, for example, may be fine or diffuse. Like the cathode ray which is diffuse or may be interrupted by bursts of electrical activity, patients who have integrative impairment show similar diffusion in their thinking process, their way of coming to grips with reality, their way of experiencing a physical phenomenon.

Over and over in the performance of the mirror test we have found intelligent, well integrated adults demonstrating minimal hesitancy at the beginning of the test, correctly orienting themselves to the various positions in space. It would seem that they are able to concentrate a stream of order or effort on the task at hand, to show minimal inhibitory factors entering into the test situation. Whereas in individuals who have organic lesions, diffuse cerebral pathology, as in a chronic alcoholic, and in some schizophrenics, all of whom demonstrate inability to concentrate a stream of effort on anything, we find tremendous impairment. Already this technique shows *promise,* especially as a screening device establishing presence or absence of factors which might impair psychobiological function. It is felt that this technique can be made use of in the evaluation of EST, post-traumatic syndrome, cerebral dysrhythmia and in case of toxic psychosis, etc. For the evaluation of the mirror test in frontal lobotomy, sufficient evidence has not been collected to justify definite conclusions.

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Neurological Clinical Pathological Conference

of the

Cincinnati General Hospital

CHARLES D. ARING, M.D., *Editor*

Case No. 13810

Presentation

A 50-year-old white woman, a housewife, first entered the hospital on January 30, 1949 because of trouble with her legs. One year previously she began to notice numbness and tingling in her legs with occasional cramps in the thighs and legs. There was persistent stiffness and weakness with difficulty in extending the legs and occasional involuntary flexion at the hips and knees. For three months there had been increasing fatiguability, most notable later in the day. She would have to rest during the day if activity was anticipated in the evening. During the three months prior to admittance she was particularly bothered by being wakened up at night with leg cramps, and by her progressive inability to walk without support.

For four months (September-December) she had observed increasing intolerance to cold at night. Three months before coming to the hospital her doctor had prescribed dexedrine as an adjunct in weight reduction. This was taken for two months and was associated with anorexia, mild nausea at times, and occasional vomiting. She lost 25 pounds with persisting anorexia even after the medication was stopped. Three days prior to admission she arose in the morning and experienced sudden dizziness and nausea while in the bathroom. The room appeared to spin to the right. Slight blurring of vision had been noted for a few days previously.

Two years previously she had been told that she was anemic. Recently she had been taking liver injections and estrogens. She had received estrogen intermittently for five years. For two years there was nocturia twice nightly, and more recently loss of urinary urge and control. For two months she appeared to cry with only slight provocation. There was chronic constipation.

At the time of admission to the hospital the temperature was 97.4 degrees F, pulse rate 98, respiration 20, blood pressure 100/70, weight 140 pounds. The general physical examination was normal. The skin of the face was tan and there was mild costo-vertebral tenderness on the right.

Neurologically the deep reflexes were more active on the right, and abdominal skin reflexes were absent. Plantar responses were equivocal bilaterally. Moderate ataxia was seen on finger-nose-finger testing on the right; heel-knee-shin tests were performed "fairly well." In the Romberg position she fell to the left and backward; the gait was limp and she favored the right leg. Strength was normal to testing. A sensory examination revealed no abnormality.

Laboratory Data: Urine: Specific gravity ranged from 1.015 to 1.017, reaction acid. A few pus cells and many bacteria were present on admission. Red blood cells were 5 million, white blood cells 8700, neutrophils 63%, lymphocytes 29%, monoytes 6%, eosinophils 2%, hemoglobin 14.6 gm. (essentially the same as another complete blood count on the 12th day). Blood serological tests were negative. Plasma Na Cl 567 mg. Gastric analysis revealed the presence of free acid. Lumbar puncture: Initial pressure was 90 mm., after the removal of 10 cc. final pressure 20 mm.; the Queckenstedt test was normal. The fluid contained 7 lymphocytes and 8 red blood cells per c mm. Protein was 42 mg.%, chlorides 683 mg.%, serology negative, negative culture. Roentgen study of biliary and gastrointestinal tracts were normal. The BMR was —10% on January 7, 1949.

On the second hospital day bilateral Babinski responses were described and also ankle clonus and increased patellar reflexes. Her family doctor said that he had found these abnormal reflexes in his examination just prior to hospital admission but not at the time of an examination one month be-

fore. Neurological consultation on the sixth day revealed slight pallor of the optic discs, slight tremor on finger-nose-finger tests and weakness of the right grip. Abdominal skin reflexes were normal. Deep reflexes in the legs were 3 plus and there were bilateral Babinski responses. Perception of vibration was absent over the sacrum, but normal elsewhere. The bladder was hyperactive with frequent and precipitate emptying. The patient displayed emotional lability and anxiousness. She continued to be listless and light-headed; the blood pressure remained at moderately low levels (80/60 and 90/60). There was occasional vomiting.

A number of medications were given, among them 1 cc. of tetraethylammonium chloride on the 13th day. The latter resulted in generalized tingling and fall in blood pressure to zero. Pulse and respirations stopped momentarily. In a few minutes she recovered spontaneously.

She was discharged from the hospital on the 14th day essentially unimproved. Her vomiting became worse after discharge, occurring 10-15 minutes after meals. She was readmitted on February 23, 1949. The examination was just as before, except that the Babinski responses were less convincing.

Urine specific gravity was 1.013, there were clumps of white blood cells and occasional granular casts. Many bacteria (B coli) were present. Hemogram was as before. The fasting blood sugar was 64 mg., Na Cl 585, Ca 11, PO_4 4.2, K 5.05 M. eq/L, Na 311 mg. Intravenous glucose tolerance: fasting 60, ½ hour 142, 1 hour 104, 2 hours 74; urine specimens at all times were positive for sugar. A Kepler test was inconclusive due to vomiting. Roentgen plates of the skull were normal. EKG showed low voltage in limb leads, thought to be suggestive of myocardial damage.

On the fifth day after this laboratory work was completed, she was placed on cortalex, 2 tablets t.i.d., also enteric coated sodium chloride (among other things). She showed no improvement. Subsequent blood pressure readings ranged between 80/60 and 90/60. She was discharged after nine days.

She was readmitted for a third time on March 15, 1949 with the same complaints of weakness, anorexia, weight loss and lethargy. Blood pressure was 90/60 at this time. A few areas of deep brown pigmentation were noted in the right flank. Examination was otherwise normal.

Urine specific gravity was 1.011, pH 7.5 and there were a few pus cells and bacteria in the specimen; sugar was 4 plus (morning after IV glucose), acetone positive. Hemogram was as before. Blood chemistry was as follows; blood urea nitrogen 16, Na Cl 573, Na 321. A wet eosinophil count dropped from 144 to 55 in two hours after 0.2 mg. of epinephrine in 250 cc. of saline was given. In four hours it was 177. Roentgenograms of the chest and genito-urinary tract (intravenous pyelograms) were normal. She did not improve and on the 15th day she was again discharged. She was presented at grand rounds as an out-patient, where it was decided to give her large doses of adrenal extract.

Her condition remained poor. She vomited intractably and became increasingly weak to the point of complete exhaustion. On the day before her final admission 1000 cc of normal saline containing 10 cc of adrenal extract were given without effect. She was admitted for the last time as an emergency on April 22, 1949. Iritis had developed in the left eye. The systolic blood pressure was 74, the diastolic was unobtainable. She was thin but not emaciated. Inflammation of the left cornea was present. One examiner noted increased pigmentation and freckling in the skin and bucal mucosa, absence of axillary hair and sparse pubic hair. Urine specific gravity was 1.010, acetone was present; sugar was negative. Red blood cells, 3.12 million, white blood cells 5250, 71% neutrophils, lymphocytes 23, monocytes 6, Hg. 12.9 Na Cl 510. Urine on the third day: specific gravity 1.008, sugar 4 plus.

Electroencephalogram on the 5th day revealed a generalized slow dysrhythmia.

She was given intravenous fluids and 10 cc adrenal extract daily for three days. She was confused mentally and at one time was found disorientedly walking around the halls. The blood pressure was 96/64 on the third day. Her strength improved, and she began to eat fairly well. On the 8th day

10 cc. of cortical adrenal extract were given. Ventriculographic studies revealed no abnormalities. She withstood the procedure well and received a unit of blood during the operation. Intravenous fluids and 25 cc of adrenal extract were given the day after operation. Blood pressure ranged from 96/74 to 112/80. She was confused and appeared to be blind. The temperature rose to 104 degrees F. Jargon aphasia was described. Stiffness of the neck was noted. Lumbar puncture revealed normal pressure and red blood cells in the fluid, which was xanthochromic. She expired on the 12th day of the fourth hospital admission.

Differential Diagnosis

*Mr. Howard Feigelson**: The adrenal gland is composed of medulla and cortex. The medulla gives rise to epinephrine and cortex to about 20 crystalline steroid compounds. Chronic insufficiency of the adrenal cortex is termed Addison's disease and may be due to tuberculosis, atrophy, amyloid disease, neoplasms, vascular lesions, fatty degenerations, pyogenic infections and anterior pituitary deficiency. Syphilis, metastases, pressure atrophy, hypoplasia and trauma are rare etiological factors. In the tuberculous type, it has been found that there is no other active lesion of tuberculosis in 30 per cent of cases.

The signs and symptoms produced by Addison's disease are: insidious onset, nausea, vomiting, anorexia, constipation or diarrhea, muscular weakness and languor, low blood pressure, reduced circulation rate, low metabolic rate, subnormal temperature, sodium decrease and potassium increase in the blood serum, hemoconcentration, weight loss, renal insufficiency, depression of sexual function and hypoglycemia. Weakness of the heart and circulation are also usually found and include syncope, vertigo, numbness and tingling of the hands and feet, intolerance to cold, dyspnea and palpitation on exertion, anginal pain, and small, soft, rapid pulse. Mental and nervous manifestations include asthenia, afternoon fatigue, apathy, loss of power of concentration, drowsiness, depression, apprehension, irritability, disorientation, confusion, delirium, hallucinations and delusions. Vision may be blurred. Intercurrent infection, trauma and dietary indiscretions may produce crises.

The diagnosis of Addison's disease can be made on the basis of such signs as progressive asthenia, increasing pigmentation, weight loss, gastro-intestinal irritability and hypotension with a small heart. The increased pigmentation is the most characteristic sign of Addison's disease. The diagnostic problem is primarily one of differentiating this disease from the other diseases which produce hyper-pigmentation. These include pregnancy, malaria, arsenic poisoning, argyria, hyperthyroidism, chronic glomerulonephritis, pernicious anemia, melanoma, generalized neurofibromatosis and those producing jaundice. Tuberculosis is a cause of hyper-pigmentation which must be considered, but since there is no history or signs of tuberculosis we can dismiss this possibility unless we believe that a tuberculous adrenal gland was producing this disease. Carcinoma may also produce hyperpigmentation but we would not expect carcinoma without adrenal involvement to produce blood chemistry changes like those that were found.

The responsibility of anterior pituitary deficit might be raised in this case. Absence of axillary hair and sparse pubic hair commonly occurs in this disorder. The fact that adrenal atrophy has been produced experimentally following hypophysectomy makes us wonder whether we are dealing with a multiple gland atrophy. In pituitary atrophy, however, we also may expect loss of teeth, dry skin, subnormal pulse, blood pressure and temperature; increased basal metabolism and hypoglycemic crisis. In addition there occurs wasting which is so marked that the patient is literally skin and bones. In many cases with loss of hair it has been found that the pituitary gland is not changed, and such cases have been thought to be due to dietary deficiency. In view of the fact that this patient had anorexia we might expect that there was dietary deficiency and hence change in hair distribution on this basis.

The neurological signs in this case were

*Senior medical student.

not particularly constant, and I am therefore excluding multiple sclerosis from my diagnostic consideration even though the very varied signs suggest this disease. I am going to put the blame for the neurological signs on the hypoglycemia which was present. We know that carbohydrate is as important to the health of nervous tissue as oxygen and the amount of glycogen available in this instance was decreased. I believe that we observe here disordered function of the nervous tissue; depending upon the level of blood sugar we have the presence or absence of neurological signs. We might speculate on the intensification of inherent weaknesses of the nervous tissue by the hypoglycemia but that would do nothing but prolong the presentation.

I believe that this is a case of simple atrophy of the adrenal gland (Addison's disease) with neurological signs produced by hypoglycemia. Death too, may be attributed to hypoglycemia. I cannot rule out tuberculosis or carcinoma of the adrenal gland:

Dr. Milton Rosenbaum: I would like to hear comment on the proposal that the neurological findings were related to hypoglycemia.

Dr. Murton Shaver: The rather vague central nervous system symptoms in some cases have been attributed to alteration in the blood electrolytes—potassium, sodium, etc., with reversible changes in central nervous function.

Dr. Rosenbaum: I have never seen hypoglycemia associated with chronic neurological signs. I saw this patient with Dr. Nathan Abrams early in her course and made a diagnosis of multiple sclerosis. When I first saw her she had had an acute attack of vertigo, and there were bilateral Babinski responses. She complained of cramps and jumping of her legs at night, which I interpreted as evidence of pyramidal tract disease. I obtained a history that during the preceding six months she suffered with staggering and paresthesias, symptoms which were intermittent in nature.

Dr. Charles D. Aring: I also saw this patient early as a consultant, in other words rather in cross section, so to speak. I think one gets a much clearer picture of what actually occurred in the longitudinal section that is outlined in the protocol. Where a visit or two is made to the bedside of a patient as actively and prolongedly ill as was this lady it is difficult to divine exactly what has gone on before you have had the opportunity to study the problem.

As far as hypoglycemia is concerned, I don't suppose many of us have ever seen chronic hypoglycemia. By that I mean a state in which there was the opportunity for the maintenance of the hypoglycemic state so prolongedly as there was in this woman. It is not unusual to have seen patients with adrenal tumor in whom there occur the acute hypoglycemic attacks such as were mentioned by Dr. Rosenbaum. Such patients just seem to fade away into dysfunction and as soon as they are given a drink of orange juice or sugar water, they revive and appear to be perfectly normal. Some of you have had a good deal of experience with the hypoglycemia of insulin shock. There too one sees the rather more acute onset of symptoms and their relief with the administration of sugar. I believe that Mr. Feigelson has made a good case that the picture presented may well be due to the imbalance of glucose metabolism, perhaps as Doctor Shaver suggests, aided and abetted by shifts in serum potassium and sodium.

Dr. Nathan Abrams: To the best of my knowledge the potassium and sodium studies were always normal. Also the neurological symptoms as far as I know were constant. When the patient was admitted, the house officer believed that the plantar responses were flexor; however, from then on everyone believed them to be extensor.

Pathological Discussion

Dr. Philip Wasserman:* Before presenting the pathological findings I might comment on the chemical findings. The points raised regarding hypoglycemia make this course worthwhile. The blood sugar values as I look over the protocol are 60 and 64 mg. It is well to realize that our normals begin at 70 mg., so that a figure of 60 and 64 isn't too impressive. I am quite certain we find a reasonable number of patients in whom no

*Assistant Professor of Pathology.

thought of hypoglycemia is entertained with these levels.

I would agree that the other laboratory findings are not strikingly abnormal. The sodium values were 311 and 321 mg., on the low side and possibly abnormal but not strikingly so. We have no real reason to think that the sodium values were consistently low. The potassium determinations are certainly within the normal range as are also the chloride values. The wet eosinophil count I think is abnormal. As I gather, normally it should show a drop of not less than 50 per cent of the control count and in the protocol there is mention of a drop of more than 50 per cent.

Dr. Abrams: I believe the normal response is at least a 50 per cent drop. Our concern with the test was whether or not it should have returned to normal in two hours. Ordinarily when ACTH is given the eosinophil count should stay depressed for four hours; however, when adrenalin is given it may show a response in two hours, a return to normal in four.

Dr. Wasserman: I have paid little attention to eosinophil counts since I have not thought that they are particularly helpful.

Mr. Feigelson: In relation to hypoglycemia in Addison's disease, Thorne notes that signs of hypoglycemia are exaggerated in the presence of this disease.

Dr. Wasserman: There might be that element in the clinical picture. The autopsy was somewhat incomplete because of the permit limitations. Our diagnosis is idiopathic cytotoxic atrophy of the adrenal glands.

I think it worthwhile to show certain normal findings especially as they relate to the brain since the diagnosis of multiple sclerosis was entertained. The kodachrome slide (projected) of the stained gross brain sections shows no evidence of degeneration. This is seen all the more clearly in comparison with a similarly stained gross preparation of a known case of disseminated sclerosis. The areas of degeneration are indicated by the spotty blue staining in the picture.

The organ of importance in this case was the adrenal gland. The kodachrome slide of a mid-line section of the gland—compared with an analogous section of a normal gland —shows how striking the atrophy was. Certainly less than one-fourth of the total gland remains.

Microscopically the cortical diminution is still more evident. The greater portion of both the cortex and the medulla is replaced by a dense lymphoid cell infiltration. There is no actual necrosis. No granulomata or neoplasm are seen. Scattered in the various sections are nests of recognizable cortical cells. Whether or not these cells were normally active is difficult to evaluate from the microscopic appearance.

The gross and microscopic examination of the remaining organs, including the brain and pituitary gland revealed no striking abnormalities. There was a terminal moderate patchy pneumonia.

The diagnosis is Addison's disease due to cytotoxic atrophy of the adrenal glands.

Clinical Diagnosis

Atrophy of the adrenal glands.

Mr. Feigelson's Diagnosis

Addison's disease (neurological signs produced by hypoglycemia).

Anatomical Diagnosis

Addison's disease due to cytotoxic atrophy of the adrenal glands.

Student: Were the ovaries and thyroid gland examined?

Dr. Wasserman: The thyroid was not examined; the ovaries were normal.

Dr. Joseph P. Evans: Was the spinal cord obtained?

Dr. Wasserman: No; permission for autopsy was only granted for a small incision, and through it we obtained a lot of organs.

Student: How do we finally account for the neurological findings?

Dr. Shaver: In this case there was some generalized swelling of myelin sheaths. The neurofibrils showed nothing more than slight swelling. Certainly there was no distinct disease of the brain. The cerebral vessels were congested.

Dr. Wasserman: Was there any determination of 17-ketosteroids?

Dr. Abrams: No there was not.

Student: Why did she have no better response to treatment?

Dr. Abrams: That was one of the reasons we doubted the diagnosis of Addison's disease. The case seems fairly easy of diagnosis from the protocol. However, when I was seeing this patient it was a far more difficult proposition. She was presented at Grand Rounds and it was the opinion that she ought to be treated for Addison's disease. While it was thought that 10 cc of adrenal extract was not a large enough dose in crisis, it was believed that she should have shown some response in her condition. She was given this amount daily with no response. Several physicians mentioned that they had never seen a patient with Addison's disease who showed the eosinophil response that this patient did. For these reasons the ventriculogram was done in an attempt to pull together the neurological signs and the other findings. However, ventriculogram showed nothing abnormal and she went into adrenal insufficiency following it and did not come out of it.

Dr. Daniel Osher: In regard to the ventriculogram, the patient had had abnormal neurological signs, abnormal EEG, and she was progressively going downhill. It was almost in desperation and to make a diagnosis that a pneumoencephalogram was attempted. Before any air was injected, in fact before the spinal tap, the patient collapsed when she was sat up. Her blood pressure fell; obviously we could not do a pneumoencephalogram, therefore ventriculography was done. She had one of the unusual responses to ventriculography. She became blind. Temporary blindness following ventriculography happens on rare occasions. At autopsy there was nothing unusual in the occipital lobes. Patients with adrenal insufficiency respond poorly to any type of operative procedure. She was bad before ventriculography and much worse after it.

Dr. Evans: Was there any increase in intracranial pressure?

Dr. Osher: Not to my knowledge.

Dr. Aring: It would have been more satisfactory if we had been allowed to take the spinal cord for study; then I think we would have felt a little more certain. This conference has alerted us to the fact that adrenal insufficinecy may produce longstanding neurological signs.

Fundamentals of Psychosomatics in Relation to Therapy

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Contemporary medical literature lays much stress on the inseparability of mind and body, although such a conception of clinical manifestations was known and expressed by writers as early as the seventeenth century. Morton and competent subsequent authors such as Gull, Lasèque, and many others considered the malfunctioning of a body as a reciprocal effect of emotions and physiological action. Observations of this character have gradually accumulated, all pointing toward the correctness of this contention. Difficulty, however, is experienced in determining which of the two processes plays the primary or original role: the physiological or psychological structure. The solution of this question would naturally have a considerable bearing on the therapeutic management of psychosomatic cases.

A careful analysis of the various opinions recorded in the literature does not lead to any well defined conclusion in the great majority of cases. Confusion follows and therapeutic results are uncertain. Recurrences of bodily disfunction are frequent. This is a common observation. As the problem stands to-day, the medical camp is divided: some earnest writers report observations with autopsy material showing anatomical lesions in their cases which, during life presented striking clinical manifestations of malfunctioning personalities. Others put forward apparent evidences of physiological disfunctioning, originated exclusively by disturbing emotional forces. We also see

instances in which the pendulum swings at one time in the direction of a psychogenic origin, at another time in the direction of somatic origin. Naturally, such a variety of pathogenetic factors is bound to have its repercussion on the therapeutic approach. Indeed a great variety of therapeutic methods is being utilized.

In reading descriptions of psychosomatic cases one is amazed at the strenuous efforts made by the writers to envisage their observations only and exclusively in accordance with their respective preconceived ideas, as if no other interpretation is at all possible. That these efforts are overstretched and over emphasized, is only too evident. Let us take for example the history of "Anorexia Nervosa." Simmonds considers this clinical phenomenon as due only to the material destruction of the pituitary gland. Others, admitting the role of the pituitary insist, however, that there is only a functional dyspituitarism. Still others state that this form of anorexia is only a graphic illustration of the influence of emotions on bodily functions, primarily a psychologic and only secondarily a physiologic disorder supervenes. According to the latter conception powerful psychodynamic forces lead to starvation and emaciation. Such is the nosological situation of the psychosomatic syndrome called "Anorexia Nervosa." The same critical remarks are applicable to a host of psychosomatic entities. The contemporary literature contains innumerable examples of this character.

The writer of these pages has been making an effort to avoid overemphasizing one pathogenetic element over another in psychosomatic medicine. He firmly believes that such an attitude cannot have a legitimate place in scientific medicine and that the therapeutic management is therefore bound to lead to undesirable results. He believes that the only method in management of psychosomatic syndromes should consist of coordinating the psychic underlying forces and the usual clinical attention to the somatic disorders. He firmly believes that of the two etiological elements the latter should invariably have precedence in our therapeutic efforts. The psychological requirement must accompany the physical requirement, but only as an accessory measure, in view of the fact that no patient, however intelligent, will be intellectually satisfied with our interpretation of his gastric, intestinal, cardiac or any other visceral disturbances, as due exclusively to a disorder in his emotional life. Psychotherapy should be practiced in all such cases imperceptibly and without conspicuous or undue emphasis. Desirable psychological results will be obtained together with somatic improvement in such a dual method, in the order indicated, if instituted at the very onset of treatment. Such has been the experience of the writer even in cases with the most pronounced disturbances in the realm of emotional life and accompanied by very mild somatic symptoms. The attention of psychosomatic invalids of all types is invariably and solely concentrated on their physical disability. Our task therefore is the therapeutic attack on this front first of all. This is a plea for a correct and efficient orientation in the very large field of psychosomatics.

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Periodic Relapsing Catatonia: (ADDITIONAL NOTE)

Since we wrote our paper, Periodic Relapsing Catatonia: Simplified Diagnosis and Treatment (Dis. Nervous System, November 1948), we have had a personal communication from Dr. Rolf Gjessing in the nature of a correction and amplification. He points out that:

1. The elaborate examinations he has reported were aimed not so much at therapy as at an understanding of the spontaneous variations in the untreated patient. For therapeutic purposes, he adopts the following method: A daily record is made of the patient's pulse, rectal temperature, weight, and psychic condition. The patient is kept on a simple low protein, high vitamin diet (The "H" diet in Mitt. III, Arch. f. Psych. u. Nervenheil., 1935); the same diet is given each day. Three times weekly, the non-protein nitrogen of the blood is determined. When definite oscillation of the NPN is observed, with a definite periodicity, intervention with thyroxin is indicated just when the NPN curve has reached its lowest point and is just starting up again. The NPN may vary plus or minus 20% from the mid-value, sometimes more. In such periodic cases, the prognosis is good. The fluctuations of temperature and pulse parallel the patient's mental state; the NPN maxima may, on the other hand, be somewhat out of phase with the psychic curve, but the length of each period is the same.

2. A thyroid delirium is not sought, only a strong and definite effect. The pulse-rate is not decisive; but irregularity of the pulse, or cardiac insufficiency, is an indication for interruption of the treatment for the time being. It is desirable for the systolic blood pressure to rise during treatment and remain elevated.

2. Since 1929, all cases showing definite periodicity, both men and women, have received the thyroxin and thyroid treatment. Thyroxin-resistance is more frequent in women than in men; and the total doses needed of thyroxin are larger in women (50 to 80 mgm.) than in men ,(40 to 50 mgm.).

It has become apparent that if the thyroxin is started at the right moment, just as the NPN curve begins to rise, the periodicity can be broken immediately; if it is started too early in the phase, periodicity continues though it can usually be levelled off in the course of several months with proper thyroid dosage.

4. This treatment demands that the patient be kept under observation and medical control; checks are necessary at first weekly, later on monthly, and finally a couple of times a year, to determine the proper continued thyroid dosage. The patient returns to the hospital for a couple of days for determination of basal metabolic rate, temperature, pulse, weight, blood-count, and non-protein nitrogen. When compensation has been successfully established with thyroid-thyroxin treatment, the fluctuations in NPN seldom exceed plus or minus 5%.

Improper selection of cases (those with definite periodicity) and failure to observe variations in phase and the proper moment of intervention with thyroxin, may result in failure and may tend to discredit the method.

Dr. Gjessing states that up to 1937 he treated over 50 women and 60 men; he had not compiled the totals since then. He expresses the hope that the above clarifying data "may be useful for whomever would wish to use this method in suitable cases."

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